

**Abstract of the Disclosure**

5 A semiconductor device includes a substrate and an active region formed in the substrate proximate an upper surface of the substrate. The active region includes at least one circuit element formed therein. At least one channel is formed in a back surface of the substrate opposite the upper surface of the substrate, the channel being formed proximate the active region. The channel is substantially filled with one or more layers of a thermally conductive material and configured so as to provide a thermal conduction path for conducting heat away from the active region.